

**CLAIM:**

1. A multi-functional electrical stimulation system adapted to produce output signals for effecting faradic, electromagnetic and other forms of electrical stimulation for a broad spectrum of different biological and bio-medical applications, said system being provided with an electrical stimulation signal stage comprising:

A. a plurality of different signal generators, each producing a signal having a distinct predetermined shape, at least on said signal generators producing pulses;

B. means associated with the generators to adjust the respective electrical parameters of the signal including the amplitude, shape and timing parameters including the duration and repetition rate of the pulses; and

C. selector means coupled to the signal generators to select as an output signal the signal yielded by the selected generator which is adjusted to be appropriate for its intended stimulation application.

2. A system as set forth in claim 1, in which one of the generators produces a sine wave.

3. A system as set forth in claim 1, in which one of the generators produces a square wave.

4. A system as set forth in claim 1, in which one of the generators produces a sawtooth wave.

5. A system as set forth in claim 1 in which said means associated with the generators to adjust the electrical parameters includes a serial input port.

6. A system as set forth in claim 1, in which said means to adjust the electrical parameters further includes parallel input ports.

7. A system as set forth in claim 1 further including at least one output stage into which is fed said output signal, the output stage processing the electrical

stimulation signal to provide a signal appropriate to the application for which it is intended.

8. A system as set forth in claim 7, in which the output stage processes the signal to yield a high or low voltage or current output.

9. A system as set forth in claim 8, in which the output stage has multiple output terminals.

10. A system as set forth in claim 7, further including a measuring stage adapted to measure and display the electrical stimulation signal being applied to a substance being treated as well as the outputs of various sensors which sense conditions prevailing in this substance.

11. A system as set forth in claim 10, in which one of said sensors senses pH.

12. A system as set forth in claim 11, in which another of said sensors senses a gas.

13. A system as set forth in claim 12, in which the gas is oxygen.

14. A system as set forth in claim 1, in which the generators are formed as an integrated circuit.

15. A system as set forth in claim 7, in which the signal generators and the output stage are formed as an integrated circuit.

16. A system as set forth in claim 10, in which the signal generators, the output stage and the measuring stage are formed as an integrated circuit.

17. A system as set forth in claim 10, in which the outputs of said sensors which sense conditions prevailing in said substance are fed back to the system to adjust the electrical parameters of the signal so that it is appropriate for the electrical stimulation application.